

GAVRILOVA, S.A.; SHAKHOVA, Z.F.; PETRACHKOVA, G.M.

Products of addition of some organic bases to thorium molyb-  
denic heteropolyacid. Vest. Mosk. un. Ser. 2 Khim. 19 no.2:  
54-58 Mr-Ap'64 (MIRA 17:6)

1. Kafedra analiticheskoy khimii Moskovskogo universiteta.

SHAKHOVA, Z.F.; GAVRILOVA, S.A.; ZAKHAROVA, V.F.

Analysis of molybdenum heteropoly compounds of selenium (IV).  
Vest. Mosk. un. Ser. 2: Khim. 20 no.6:79-81 N-D '65.

(MIRA 19:1)

1. Kafedra analiticheskoy khimii Moskovskogo universiteta.  
Submitted Feb. 26, 1965.

AUTHOR:

Gavrilo, S.P.  
Gavrilova, S.P.

5-3-21/37

TITLE:

Contact Metamorphism of Granitoids (Kontaktovyy metamorfizm granitoidov)

PERIODICAL:

Byulleten' Moskovskogo Obshchestva Ispytateley Prirody, Otdel Geologicheskiiy, 1957, No 3, pp 167-168 (USSR)

ABSTRACT:

Contact metamorphism is subdivided into contact metamorphism properly, pneumatolytic and hydrothermal metamorphisms. The author considers only the first type of metamorphism. The problem of the origin of crystalline slates within the general problem of contact metamorphism has not been studied sufficiently. According to most opinions, crystalline slates are originated in the contact aureole when the depth of intrusion solidification is considerable. The character of the contact aureoles is determined by tectonic conditions of the settling process of granite massifs. Synkinematic (or syntectonic) intrusions give rise to extended aureoles of crystalline slates. In these cases intrusions obey to the slaty cleavage of the enclosing rocks and have large contact surfaces. There are no petrographic differences between crystalline slates in deep zones of regional metamorphism

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Contact Metamorphism of Granitoids

5-3-21/37

and crystalline slates in the contact aureoles of granite massifs.

AVAILABLE: Library of Congress

Card 2/2

GAVRILOVA, S.P.

Paragenetic analysis of metamorphic formations of the  
northwestern part of the Irtysh zone of crumpling. Izv. vys.  
ucheb. zav.; geol. i razv. 2 no.12:84-99 '59. (MIRA 14:6)

1. Moskovskiy geologorazvedochnyy institut imeni S. Ordzhonikidze.  
(Irtysh Valley--Rocks, Crystalline and metamorphic)

GAVRILOVA, S.P.

Genesis and age of crystalline rocks in the Irtysh shear zone.  
Izv.vys.ucheb.zav.;geol. i razv. 4 no.8:115-119 Ag '61. (MIRA 14:9)

1. Institut mineralogii i geokhimii redkikh elementov AN SSSR.  
(Altai Mountains--Rocks, crystalline and metamorphic)

GAVRILOVA, S.P.

Granitoids in the northwestern part of the Irtysh shear zone.  
Bul.MOIP.Otd.geol. 37 no.5:170-171 S-O '62. (MIRA 15:12)  
(Siberia, Western--Granite)

GAVRILOVA, S.P.; KHRYUKIN, V.G.

Interrelationship of alkali and granite rocks in southeastern  
Tuva. Dokl. AN SSSR 154 no.5:1087-1090 F'64. (MIRA 17:2)

1. Institut mineralogii, geokhimii i kristallokhimii redkikh  
elementov. Predstavleno akademikom V.I. Smirnovym.



GAVRILOVA, T. A. Cand Biol Sci -- "<sup>Effect</sup> ~~Action~~ of fresh, refrigerated, and stabilized lymph <sup>upon</sup> ~~of~~ the cardiovascular system of animals under experimental conditions."  
Kirov, 1960 (Min ~~of~~ ~~Agriculture~~ RSFSR. Kazan' State Vet Inst im N. E. Bauman).  
(KL, 1-61, 187)

-109-

GAVRILOVA, T.A.

Effect of lymph on the cardiovascular system of animals; effect  
of lymph on the isolated heart of warm-blooded animals. Trudy Kirov.  
otd. Vses. fiziol. ob-va 1 no.1:52-54 '60. (MIRA 14:8)

1. Kafedra normal'noy fiziologii sel'skokhozyaystvennykh zhiivotnykh  
s biologicheskoy khimiyey Kirovskogo sel'skokhozyaystvennogo instituta.  
(LYMPH) (HEART)

GAVRILOVA, T.A.

Effect of lymph on the cardiovascular system of animals; effect of lymph on the excitability of the vagosympathetic nerve trunk of a frog. Trudy Kirov. otd. Vses. fiziol. ob-va 1 no.1:55-59 (MIRA 14:8)  
'60.

1. Kafedra normal'noy fiziologii sel'skokhozyaystvennykh zhivotnykh s biologicheskoy khimiyey Kirovskogo sel'skokhozyaystvennogo instituta.  
(LYMPH) (VAGUS NERVE) (HEART)

BAYBULATOVA, S.G., aspirant; GAVRILOVA, T.B., kand.tekhn.nauk

Dispersion capacity of flour obtained with separate break systems.  
Soob. i ref. VNIIZ no.4:16-21 '61. (MIRA 16:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zerna i produktov  
yego pererabotki (for Baybulatova). 2. Moskovskiy gosudarstvennyy  
universitet (for Gavrilova).

(Flour)

GAVRILOVA, T.B.

804. Comparative evaluation of methods of sedimentary analysis. T.B. Gavrilova (Moscow State Univ.) *T.B.*

22 (8), 891-896. Suspensions of quartz, even at high concn. of the dispersed phase, and  $\text{BaSO}_4$  (unstable at relatively low concn. of the dispersed phase) in water are subjected to sedimentary analysis by various known methods. It is considered that stable suspensions are examined preferably by methods that can be used with the lowest concn. of the dispersed phase, but otherwise any of the published methods are suitable. With unstable suspensions it is essential to use methods applicable to the minimum concn. (5-0.3% by wt.) of the solid phase. G. S. SMITH

*DM*

AUTHOR: Gavrilova, T. B. SOV/32-24-7-46/65

TITLE: A Photoelectric Counter (Fotoelektricheskoye otschetnoye ustroystvo)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 7, pp. 888 - 888 (USSR)

ABSTRACT: In the deformation determinations of the glass point of the sedimentometric micro-balance usually a horizontally mounted microscope equipped with an eye piece scale or a cathetometer is used. According to suggestions by N. A. Figurovskiy a photoelectric scheme was devised which consists of a selenium photoelement UP-101, a light source and a milliammeter of the type M-193. The measuring principle consists in the fact that a slit lamella is suspended from the beams of the sedimentometric micro-balance; the light beam passes through that slit and thus changes the intensity of the light striking the photoelement when the position of the beam is changed. The results of the analyses obtained this way do not differ from those obtained according to the usual method. A graphic representation of the measurements according to either method

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A Photoelectric Counter

SSV/32-24-7-46/65

for a quartz suspension is given. The measuring technique can also be automatized by using an automatic recording apparatus or an oscillograph instead of the millivoltmeter. There are 2 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

Card 2/2

7(0)  
 AUTHORS: Figurovskiy, N. A., Gavrilova, T. B. SOV/32-24-11-30/37

TITLE: A New Centrifugal Apparatus for Sedimentometric Analysis  
 (Novyy tsentrobazhnyy pribor dlya sedimentometricheskogo analiza)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol 24, Nr 11, pp 1417-1419  
 (USSR)

ABSTRACT: The main shortcoming of dispersion analyses, including sedimentometric methods, is the fact that no complete distribution curves are obtained for the range of particle sizes below one micron. For determinations of particle sizes between 1 and  $0.05\mu$ , low speed centrifuges with an intensity of the centrifugal field of 500-3000 g are of special interest, as various indicating instruments can be more easily adapted to them, besides the photoelectric devices (as in the ultra-centrifuges according to Svedberg, Mak Beyn, and others). A new apparatus was developed consisting of a centrifuge of 1500 R/minute. The centrifugal acceleration amounts to:

$$C = \left( \frac{2\pi n}{60} \right)^2 x = 628 \text{ g}$$

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A New Centrifugal Apparatus for Sedimentometric Analysis

SOV/32-24-11-30/37

( $n$  = number of revolutions per minute,  $x$  = 25 cm - distance of the sedimenting particles from the center of rotation,  $g = 981 \text{ g/sq.cm.}$ ). Basically the apparatus consists of a rotating steel and aluminium disc with bars to hold the receptacles of sedimentation. The reading of the sedimented amount of substance can be carried out by means of a beam of light which is reflected by a mirror mounted in the center of the disc or more accurately by means of a potentiometric cell and a galvanometer. The operation of the apparatus is shown in sedimentometric analyses of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$  powders as well as of a  $\text{Cr}_2\text{O}_3$  suspension. There are 4 figures and 4 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University im. M. V. Lomonosov)

Card 2/2

GAVRILOVA, T. B., Candidate Chem Sci (diss) -- "Investigation of the sedimentometric analysis of suspensions". Moscow, 1959. 15 pp (Moscow State U im M. V. Lomonosov) Chem Faculty), 150 copies (KL, No 25, 1959, 128)

5(4)

SOV/69-21-3-21/25

AUTHORS: Figurovskiy, N.A., and Gavrilova, T.B.

TITLE: Sedimentometric Analysis of Highly Disperse Suspension  
With the Aid of a Centrifugal Balance

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 3, pp 354-358  
(USSR)

ABSTRACT: The authors describe an apparatus (centrifugal sedimentation balance) for the analysis of suspensions in a field of centrifugal force. They further report on the results of a number of measurements of the distribution of the disperse phase - quartz in water and gypsum in ethyl alcohol medium - carried out with the aid of the balance. The basic part of the apparatus used was a centrifuge with 1,500 rotations per minute. The centrifuge was driven by a direct current motor. Distance from the rotation center to the bottom of the receptacle with the suspension under examination:

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$x_2 = 27$  cm,  $x_1 = 22$  cm (See Swedberg-Rinde formulae

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Sedimentometric Analysis of Highly Disperse Suspension With the Aid of a Centrifugal Balance

(1) and (2) in the article). The centrifugal acceleration obtained with the centrifuge was 628 g, the time of dispersion 30 seconds. The design of the centrifugal balance (diagram 1) was as follows. On a rotating disk two diametrically opposed receptacles were fastened. One of them was filled with the suspension, the other with the dispersing medium. Due to this circumstance, the centrifuge was well balanced during the experiment. To the end of a rod, elastically attached to the disk and passing through the rotation center, two small aluminum cups of equal weight were fastened, the cups freely entering the receptacles. During sedimentation the rod inclines to the side of the cup with the surplus weight, allowing a measuring installation to record the process. The experiments showed very good results. Data obtained by normal analysis (glass microbalance) were essentially in accordance with the data obtained with the centrifugal

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Sedimentometric Analysis of Highly Disperse Suspension With the Aid  
of a Centrifugal Balance

balance. As to the latter, the gradual quantitative diminution of the less finely fractured disperse phase in dependence on the growing size of the particles ( $0.7 - 2 \mu$ ) was due to sedimentation during the dispersing process. The experiments with the centrifugal balance were carried out within very short periods (3-5 minutes), whereas the analysis of the usual type had to be continued for several days. There are 2 tables, 1 diagram, 1 graph and 10 references, 6 of which are Soviet, 2 German and 2 English.

ASSOCIATION: Moskovskiy universitet im. M.V. Lomonosova - Khimicheskii fakul'tet (Moscow University imeni M.V. Lomonosov Department of Chemistry)

SUBMITTED: 22 October, 1957

Card 3/3

30667

S/153/60/003/02/15/034  
B011/B006

5.4400

AUTHORS: Figurovskiy, N. A., Gavrilova, T. B.

TITLE: Influence of the Concentration of the Dispersed Phase on the Entire Characteristics of the Dispersity of Suspensions 1

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1960, Vol. 3, No. 2, pp. 295-300

TEXT: Previous experiments by the authors (Refs. 7, 8) indicate that in many cases the independence of the results of sedimentometric measurements from the concentration is not due to the stability of the suspension, but rather to the slight sensitivity of the sedimentometric apparatus, which does not record changes occurring in the suspension during an increase in the concentration of the dispersed phase. The authors therefore investigated the influence of the concentration of the dispersed phase on measurement results for various suspensions, especially for those containing soluble admixtures in the dispersion medium. Data on particle size distribution in the suspension are given in the present paper. Particle suspensions of quartz, calcite, and barium sulfate in water, and of graphite in

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Influence of the Concentration of the Dispersed Phase on the Entire Characteristics of the Dispersivity of Suspensions

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B011/B006

toluene and water were investigated. Particle distribution was investigated sedimentometrically for various concentrations of the dispersed phase and in the presence of foreign substances (saponin). Table 1 shows the composition of the dispersed phase of quartz suspensions as found by analyses over a wide concentration range of the dispersed phase. For calcite and barium sulfate, the composition of the dispersed phase is represented graphically (Table 1). Figs. 2 and 3 show the influence of saponins and the solid (dispersed) phase on the above-mentioned composition. The dispersion composition of graphite suspensions in toluene for various concentrations of the dispersed phase is shown in Table 2. From the results obtained, the authors draw the following conclusions: For sedimentometric measurements, the concentration of the solid phase of the suspension must not exceed 0.5 - 0.75% by weight, and the size of suspended particles should not vary too much. A high polydispersity leads to orthokinetic coagulation, already at low concentrations. Finally, it is proved that the density of sedimenting particles is considerably changed by stabilizing suspensions with surface-active substances. There are 3 figures, 2 tables, and 10 references, 7 of which are Soviet.

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Influence of the Concentration of the  
Dispersed Phase on the Entire Character-  
istics of the Dispersity of Suspensions

20617  
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B011/B006

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova;  
Kafedra fizicheskoy khimii (Moscow State University imeni  
M. V. Lomonosov, Chair of Physical Chemistry) X

SUBMITTED: September 11, 1958

Card 3/3



GAVPELOVA, T.R.; KISHNEV, A.V.

Derivation of adsorption isotherms and rapid determination of the specific surface area by the gas chromatographic method of heat desorption. *Khim.fiz.khim.* 39 no.10:2582-2585 0 1964.

(MIRA 74:132)

I. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.  
khimicheskiy fakul'tet. Submitted July 6, 1964.

GAVRILOVA, I.B.; KREJCI, M.; DUBSKY, H.; JANAK, J.

Determination of thermal stability of chemically modified  
layers on adsorbent and carrier surface in gas chromatography.  
Chem C: Chem 29 no.11:2753-2757 N '64.

1. Laboratoriya dlya analiza gazov, Chekhoslovatskaya Akademiya  
nauk, Brno.

KHEYFITS, L.A.; SHULOV, L.M.; KOKHMANSKIY, A.V.; GAVRILOVA, T.F.; BELOV, V.N.

Terpene phenols. Part 10: Condensation of camphene with o-cresol  
in the presence of aluminum o-cresolate and conversions of the  
condensation product. Zhur.ob.khim. 33 no.6:2051-2055 Je '63.  
(MIRA 16:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskikh i  
natural'nykh dushistykh veshchestv.  
(Camphene) (Cresol)

BUT, T.S.; VINOGRADOV, B.N.; GAVRILOVA, T.I.; GORSHKOV, V.S.; DOLGOPOLOV, N.N.; MYAGKOVA, M.A.; SIROTKINA, N.L.; FADEYEVA, V.S., doktor tekhn. nauk, red.; GURVICH, E.A., red. izd-va; GOL'BERG, T.M., tekhn. red.

[Modern methods of studying building materials] Sovremennye metody issledovaniia stroitel'nykh materialov [By] T.S. But i dr. Pod obshchei red. V.S. Fadevoi. Moskva, Gosstroizdat, 1962. 238 p. (MIRA 16:1)

(Building materials)

GAVRILOVA, T.I., inzh.; MAKSIMOVA, V.G., inzh.

Method of determining soot carbon in keramzit. Sbor. trud.  
VNIINSM no.8:173-175 '63. (MIRA 17:9)

GAVRILOVA, T. L.

Level of extra-hemoglobinous blood plasma iron in hepatic cancer.  
Klin. med., 30, No 1, 1952.

GAVRILOVA, T. L.

<sup>Experiment</sup>  
~~Experience~~ in Structural Analysis of a Language (with Vietnamese as an  
Example"

presented at the All-Union Conference on Computational Mathematics and  
Computational Techniques, Moscow, 16-28 November 1961

So: Problemy kibernetiki, Issue 5, 1961, pp 289-294

GAVRILOVA, T.L.

Cybernetics in the Far Eastern State University. Probl. kib. no.9:347-  
348 '63. (MIRA 17:10)



ARZHANIKOV, N.S.; SADEKOVA, G.S.; DUBASOV, V.T., retsenzents;  
ABGARYAN, K.A., retsenzents; PRATUSEVICH, G.M., red.;  
GAVRILOVA, T.M., red.

[Supersonic flow about bodies of revolution] Obtekanie tel  
vrashcheniia sverkhzvukovym potokom. Moskva, Mosk. avitatsi-  
onnyi in-t im. Sergo Ordhonikidze, 1962. 65 p. (MIRA 16:4)  
(Aerodynamics, Supersonic)

YEFIMCHKINA, Yevgeniya Petrovna; KOZHEVNIKOV, Naum Iosifovich;  
GONOROVSKIY, I.S., retsenzent; MIKHEYEVA, Ye.A.,  
retsenzent; CAVRILOVA, T.M., red.

[Problems in the theory of probability] Zadachi po teorii  
veroiatnostei. Moskva, Mosk. aviatsionnyi in-t im. Sergo  
Ordzhonikidze, 1963. 96 p. (MIRA 1787)

SALYAYEV, R.K.; VERESOVA, Z.A.; GAVRILOVA, T.M.

Physiological aspects of the effect of adult pine roots on  
young seedlings growing in their proximity. Trudy Inst. biol.  
UFAN SSSR no. 43:149-153 '65 (MIRA 19:1)

1. Vostochno-Sibirskiy biologicheskiy institut Sibirskogo otdele-  
niya AN SSSR i Institut lesa Karel'skogo filiala AN SSSR.

GAVRILOVA, T. P.  
SHERISHORINA, S.I.; DAVIDSON, S.B.; MERINA, A.Ye.; BODUNOVA, V.A.; SHAMSHINA, M.F.;  
GAVRILOVA, T.P.

Certain data on the treatment of chronic dysentery in children with methylene blue with phthalazole. *Pediatrics*, Moskva no.3:24-26 May-June 1953.  
(CML 25:1)

1. Professor for Sherishorina; Docent for Davidson; Assistant for Merina; Physicians of Children's Home No. 2 for Bodunova, Shamshina, Gavrilova.
2. Of the Department of Microbiology (Head -- Prof. S. I. Sherishorina) and the Department of Faculty Pediatrics (Head -- Docent S. B. Davidson) of Saratov Medical Institute.

GAVRILOVA, V. [Haurylava, V.]

Let's revive this useful work. Rab. 1 sial. 35 no.10:11 '59.  
(MIRA 13:2)

(Gomel'--Public health)

BELYAYEVA, Ye. L., CAVRILOVA, V. A.

Determining prothrombin in blood. Lab. delo 6 no. [1.e. 4] no. 4818  
Jl-Ag '58 (MIRA 11:9)

1. Iz fakul'tetskoy terapevticheskoy kliniki (sav. - prof. V. A.  
Val'dman) Leningradskogo pediatricheskogo meditsinskogo instituta.  
(PROTHROMBIN)

GAVRILOVA, V.A.; FEDOROV, Yu.A.

Case of a patient not being able to use his maxillary prosthesis.  
Stomatologiya 39 no.6:70 N-D '60. (MIRA 15:1)

1. Iz Vladimirovskoy gorodskoy bol'nitsy No.1.  
(TEETH, ARTIFICIAL)

CA

3

**Influence of extraneous molecules on the absorption and fluorescence spectrum of magnesium phthalocyanine and of chlorophyll in solution.** V. B. Rystigeev, V. A. Gayrlova, and A. A. Krasnovskii (A. N. Bakh Inst. Biochem. Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 70, 201 (1959), (U. S. L. 45, 1872).—The decrease of the intensity of fluorescence of a soln. of chloro-

phyll in toluene on evacuation, and its restoration on admission of air, is due not to  $O_2$  alone but primarily to  $H_2O$  vapor. Carefully dried  $O_2$  has no effect on the fluorescence of the preliminarily outgassed soln.  $H_2O$  vapor alone was found to increase the intensity by a factor of 1-1.5, simultaneous presence of  $O_2$  lowers this increase by about 15-20%. Consequently,  $O_2$  quenches the fluorescence of a chlorophyll soln. in the presence of  $H_2O$ , also in a toluene soln. The effect of  $H_2O$  is not specific, but is common to a series of polar substances such as  $EtOH$ ,  $C_2H_5N$ ,  $Me_2CO$ , and aniline. The fact that dry  $O_2$  has no quenching action, can be explained by the superposition of an activating and a quenching effect. It must be assumed that  $O_2$  has a similar action as  $H_2O$ , only to a much lesser degree. In contrast to chlorophyll, solns. of phosphytin (free from Mg) in toluene, show no change either of the fluorescence or of the absorption spectrum on evacuation or admission of air. However, Mg phthalocyanine in toluene shows a behavior analogous to that of chlorophyll; but the spectrum of Mg-free phthalocyanine in toluene is insensitive to outgassing or admission of air. Evacuation or admission of air does not affect the absorption max. at 680 and 655 m $\mu$  belonging to metal-free phthalocyanine, but the absorption max. at 672 m $\mu$ , which belongs to the Mg phthalocyanine compd., is decreased by evacuation, and increases again when air is admitted. Consequently, the detg. factor is the presence or absence of Mg as central atom. Substances which enhance the fluorescence of chlorophyll are coordinatively bound with the Mg atom. Possibly, this binding results in a disson. of the non-fluorescing dimer into fluorescing monomers, or in the formation of compds. between the chlorophyll and polar mole.

N. Thon

1951



GAVERILOVA, E.D.

3

Effect of oxygen on absorption spectrum and fluorescence of chlorophyll solutions. V. B. Rostiginev, V. A. Gavrilova, and A. A. Krasnovskii. Doklady Akad. Nauk S.S.S.R. 66, 1131-6 (1949).—Evacuation of air above toluene solns. of chlorophyll-*a* and -*b* results in a small drop of absorption intensity at both maxima and a 2-3-m $\mu$  shift of the red band to the long-wave end; in chlorophyll-*b* the 665-70 band increases in intensity; readmission of air restores the spectrum to near-normal values, while for the 300-320 band the band shift takes place only partially reversibly. Many cycles lead to progressive decline of extinction coeff. in toluene, CCl<sub>4</sub>, and heptane; O-contg. solvents gave increased absorption on evacuation, proportional to vol. decrease (evapn.) and gave no change on air admission. Fluorescence declines on evacuation and partially rises on air admission with *a* + *b* form, while *b* form gives complete recovery. A trace of EtOH, Me<sub>2</sub>CO, or pyridine in toluene soln. cancels the variation of extinction on evacuation and air readmission. Hence, interaction of O with chlorophyll shortens the duration of the active state of the latter and serves to depolymerize the dimeric form of chlorophyll (which does not fluoresce).

G. M. Kosolapoff

Research Institute  
A.N. Sakh,  
AS USSR

AS 4-31.4 METALLURGICAL LITERATURE CLASSIFICATION

3A

**Quenching of the fluorescence of chlorophyll and of magnesium phthalocyanin in their interaction with quenchers.**  
 V. B. Fystigneev, V. A. Gavrilova, and A. A. Krasnovskii  
 Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 74, 315 (8, 1950). The following degrees of quenching of the intensity of the fluorescence of (a + b) chlorophyll solns. in EtOH were observed (quenchers  $1 \times 10^{-3} M$ ): PhNO<sub>2</sub>, 68; *m*-C<sub>6</sub>H<sub>4</sub>(NO<sub>2</sub>)<sub>2</sub>, 87; I<sub>2</sub> (0.005 M), 81; PhNMe<sub>2</sub>, 28%; in pyridine, *p*-C<sub>6</sub>H<sub>4</sub>Cl, 91.5; PhNO<sub>2</sub>, 37; *m*-C<sub>6</sub>H<sub>4</sub>(NO<sub>2</sub>)<sub>2</sub>, 78%. The corresponding data for the quenching of the fluorescence of Mg phthalocyanin, are, in EtOH, PhNO<sub>2</sub>, 70; *m*-C<sub>6</sub>H<sub>4</sub>(NO<sub>2</sub>)<sub>2</sub>, 80; I<sub>2</sub> (0.005 M), 58; PhNH<sub>2</sub>, 24; PhNMe<sub>2</sub>, 71%; in pyridine, *p*-C<sub>6</sub>H<sub>4</sub>Cl, 90; *p*-C<sub>6</sub>H<sub>4</sub>(OH)<sub>2</sub>, 6; PhNO<sub>2</sub>, 31; *m*-C<sub>6</sub>H<sub>4</sub>(NO<sub>2</sub>)<sub>2</sub>, 80; PhNH<sub>2</sub>, 4; PhNMe<sub>2</sub>, 37%; in toluene, *p*-C<sub>6</sub>H<sub>4</sub>Cl, 90; PhNO<sub>2</sub>, 50; *m*-C<sub>6</sub>H<sub>4</sub>(NO<sub>2</sub>)<sub>2</sub>, 81; PhNMe<sub>2</sub>, 17%. Strong quenchers are, without exception, oxidants; reductants either do not quench at all or quench only very weakly. Simultaneous detns. of the extinction in the red max. show that the strongly oxidizing quenchers, O<sub>2</sub>

and *p*-C<sub>6</sub>H<sub>4</sub>Cl, are practically without effect on the absorption spectrum, whereas I<sub>2</sub> and *m*-C<sub>6</sub>H<sub>4</sub>(NO<sub>2</sub>)<sub>2</sub> decrease the absorption max. markedly. Under strong illumination through a red filter, chlorophyll solns. in EtOH react strongly with O<sub>2</sub> (as evidenced by the rapid decrease of the red absorption max. with the length of exposure), hardly with *p*-C<sub>6</sub>H<sub>4</sub>Cl and *p*-C<sub>6</sub>H<sub>4</sub>(OH)<sub>2</sub>, but do react with ascorbic acid, which is without effect in quenching of fluorescence. Nor does *p*-C<sub>6</sub>H<sub>4</sub>Cl show any significant photoactivity in toluene soln. In pyridine soln., the photoactivity is most intense with ascorbic acid, less intense with O<sub>2</sub>, and still less with *p*-C<sub>6</sub>H<sub>4</sub>Cl. Consequently, there is no direct correlation between the ability of a substance to quench fluorescence and its photoactivity with chlorophyll. The absence of any rapid reversible photochem. reaction between chlorophyll soln. ( $5 \times 10^{-5} M$ ) in EtOH, pyridine, or toluene, and quinone (0.1 M) was ascertained by illumination at right angle to the direction of the spectrophotometric observation. The absence of a relation between quenching and photochem. reactivity indicates that the latter is detd. not by the electronic excited state ( $10^{-10} - 10^{-9} \text{ sec.}$ ) but by the long-lived biradical triplet state. N. Thon

CA 6-19-11-1947, V. 11.

3

Comparison of photochemical properties of chlorophyll, pheophytin, phthalocyanine, and its magnesium complex. V. B. Evstignejev and V. A. Gavrilova. *Doklady Akad. Nauk S.S.S.R.* 74, 781-3 (1950).—Continuous observations were made on the value of the extinction coeff. of chlorophyll (I), pheophytin (II), phthalocyanine (III), and Mg complex of the latter (IV), in a vacuum cell under irradiation conditions in the presence of oxidants (dissolved O, H<sub>2</sub>O<sub>2</sub>) or reducing agents (ascorbic acid and PhNH<sub>2</sub>·HCl). Mg-contg. substances are oxidized much more rapidly than Mg-free analogs (in EtOH or toluene pheophytin remains

unchanged but chlorophyll is decolorized). Photochemically oxidized I has a spectrum identical with that of II; in pyridine soln. the difference between the 2 groups is smaller. Conversely, II and IV are reduced more rapidly than I and III.  
G. M. Kosolapoff

Effect of the medium on the reaction of photochemical reduction of chlorophyll, riboflavin, and other coloring materials by organic acids. A. A. Krasovskii and V. A. Gavrilova, (A. N. Baikal Biochem. Inst., Moscow), *Doklady Akad. Nauk SSSR*, 81, 1105-1106, 1961, 45, 39571. - Photochemical reduction of chlorophyll a and b in EtOH or Me<sub>2</sub>CO is negligible when ascorbic, pyruvic, citric, malic, or succinic acids are used as H<sup>+</sup> donors. In pyridine rapid reduction takes place only with ascorbic acid, as is the case in chloroform in which medium the dark reaction irreversibly reduces both forms of chlorophyll; apparently destruction of air does not reverse the change. If S and cysteine in dimethyl sulfoxide reduce chlorophyll in the dark. Mg protolactate behaves like chlorophyll in pyridine and dimethyl sulfoxide. Riboflavin does not react in aq. soln. in the dark; illumination without addition of riboflavin causes photoreduction which is 95% reversible with O<sub>2</sub>. Citric or malic acid has little effect on this reaction, but ascorbic acid and to some extent succinic acid hinder it. Pyruvic acid in light rapidly reacts with riboflavin and the product is 100% reversible by O<sub>2</sub> treatment. In EtOH soln. photoreduction occurs without addition of riboflavin. In dimethyl sulfoxide reaction occurs without or with addition; destructive reduction being predominant; in dimethyl sulfoxide acid reacts in the dark and addition of air does not reverse the change. β-Carotene does not react in pyridine or EtOH with ascorbic or pyruvic acids. Safranine-T reacts rapidly in aq. soln. when pyruvic acid is present; ascorbic acid reacts less rapidly; other acids are inactive. The result in EtOH is the same. In pyridine pyruvic acid is most reactive, other acids are rather sluggish. In dimethyl sulfoxide all acids react in presence of light; reaction of ascorbic acid is accelerated by light. Neutral red gives photoreduction in aq. soln. only with pyruvic acid. In EtOH or pyridine ascorbic acid is least active, but in dimethyl sulfoxide reaction occurs with ascorbic acid; it is accelerated by light. Pyruvic acid gives rapid photoreduction, but other acids are sluggish. Phenindole phenol gives instantaneous reduction with ascorbic acid in all solvents in the dark; weak photoreduction occurs with pyruvic acid. Other acids are inactive. Thus the photochemical reduction schemes depend on the medium as well as on the reactants as such. Ascorbic and pyruvic acids are most active in dimethyl sulfoxide. C. M. Krasovskii

BRIN, G. P.; GAVRILOVA, V. A.

USSR

**Algae; Proteins**

Isolation of phycoerythrin from red algae; its spectral and photochemical properties. Dokl. AN SSSR 82 no. 6, 1952. Institut Biokhimi im. A.N. Bakha Akademii Nauk SSSR recd 26 Nov 1951 .

SO: Monthly List of Russian Accessions, Library of Congress, July 1952 ~~1953~~, Uncl.

USSR/Chemistry - Chlorophyll

Aug 52

"Comparison of Spectral Properties of Chlorophyll and Pheophytin in Various Solvents," V. B. Yevstigneyev and V. A. Gavrilova, Inst of Biochem Imeni A. N. Bakh, Acad Sci USSR

"DAN SSSR" Vol 85, No 5, pp 1073-1076

The absorption spectra of chlorophyll (a + b) and pheophytin (a + b) were measured in ethyl ether, acetone, pyridine, ethanol, toluene, and benzene. The fluorescence intensity and extinction also detd. The effect of the solvent on both pigments is not always the

same. The Mg in the mol plays an important role in modifying the properties involved. Submitted by Acad A. N. Terent'ev 10 Jun 52.

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YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.

Effect of some substances on the rate of photooxidation of chlorophyll a.  
Doklady Akad. Nauk S.S.S.R. 89, 523-6 '53. (MLRA 6:3)  
(CA 47 no.16:8195 '53)

1. A.N.Bakh Biochem. Inst., Moscow.

GRAVILLOVA, V. A.  
 Spectral properties of reduced forms of chlorophyll a and b.  
 V. B. Evtuginev and V. A. Gavrilova. *Doklady Akad. Nauk S.S.S.R.* 91, 899-902 (1953); *J. C.A.* 47, 1490; Krasnovskii, et al., *C.A.* 42, 6867a; 43, 30371. Chlorophylls a and b are reversibly reduced by  $\text{PhNHNH}_2$  in toluene solns. forming semiquinonoid reduced forms of these pigments, which appear to exist in 2 forms: dissociated and undissociated, which differ in their absorption spectra. When a rapid detn. of the spectrum of a soln. of chlorophyll a is made in toluene in the presence of  $\text{PhNHNH}_2$  after evacuation and 2-min. irradiation, the resulting curve has 4 max. at 518, 535, 565-70, and 415  $\mu$ . When the soln. is permitted to stand in the dark, the spectrum changes slowly; the 670 peak increases, that at 518 declines in intensity, while the 535 max. rises briefly then declines in intensity; admission of air accelerates these changes. While the original red max. of chlorophyll is 603  $\mu$ , the reverse dark reaction brings about a max. formation at 670  $\mu$ , indicating pheophytinization. The curve of the final oxidation products is that of pheophytin a. In the presence of pyridine the 535- $\mu$  band does not appear;  $\text{EtOH}$  acts similarly, but  $\text{AcOH}$  causes a decline of the 518- $\mu$  max. and increase of 670- and 535- $\mu$  maxima. Thus the 518- and 535- $\mu$  max. belong to 2 distinct substances: dissociated and undissociated forms of the reduction products. The reduced form of chlorophyll a shows fluorescence; excited by a Hg lamp it is orange-red with a definite band at 600-35  $\mu$ ; on cooling with liquid N, 2 green bands also appear (525-45 and 550-70  $\mu$ ). The latter 2 bands form only from reduced chlorophyll a which shows the 518- $\mu$  band. The similarly treated specimens of chlorophyll b has max. at 565 and 635  $\mu$ , probably caused by dissociated and undissociated forms of semiquinones. Upon standing in the dark the pheophytinization does not occur and the final spectrum agrees completely with that of the original green chlorophyll b. Fluorescence of reduced b form is somewhat more red than that of the a form, showing 600-30- and 645-70- $\mu$  bands.

chem. abs. V. 48  
 1-25-54  
 Electronic Phenomena



GAVRILOVA, V. A.

Chemical Abst.  
Vol. 48 No. 8  
Apr. 25, 1954  
General and Physical Chemistry

Oxidation-reduction potential of the photo-reduced form of chlorophyll. V. B. Bryl'man and V. A. Gavrilova (A. N. Bakh Inst. Biochem., Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 92, 381-4 (1953). —A system of calomel electrode and a Au electrode, the latter immersed in chlorophyll ab soln., evacuated and briefly illuminated, shows a rapid drop of potential of the Au electrode to the neg. side when pyridine and ascorbic acid are present. When the light is extinguished, the potential rapidly rises and levels off at a lower value than the original. The phenomenon can be repeated many times. After longer irradiation the potential drops to a min., then begins to change in the pos. direction for 30-40 min.; if light is extinguished at this stage the potential rises rapidly to the "dark" value. Chlorophyll a or b or pheophytin gave similar results, as did Zn pheophytin complex and Mg phthalocyanine. Non-fluorescent complexes of Cu and pheophytin or phthalocyanine do not show this phenomenon. The max. potential change occurs with pheophytin 0.35 v. The potential changes are much more rapid than are changes of abs. spectra of the various substances listed above. The values of the "photo-potential" were: chlorophyll ab 0.294 v.; chlorophyll a 0.290, chlorophyll b 0.240; pheophytin 0.340; Zn pheophytin 0.332; Mg phthalocyanine 0.281. The lowering of potential decreases considerably the difference between the oxidation-reduction potential of ascorbic acid and that of a H electrode.  
G. M. Kosolapoff

YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.

Initial stage of chlorophyll photoreduction. Dokl. AN SSSR 95 no.4:  
841-844 Ap '54. (MLRA 7:3)

1. Institut biokhimii im. A.N.Bakha Akademii nauk SSSR.  
(Chlorophyll) (Photochemistry)

GAVRILOVA, V. A.

USSR/Chemistry - Biochemistry

Card : 1/1

Authors : Evstigneyev, V. B. and Gavrilova, V. A.

Title : Photo-reduction of a and b-pheophytines

Periodical : Dokl. AN SSSR, 96, Ed. 6, 1201 - 1204, June 1954

Abstract : Pheophytines like chlorophylls submit to photo-reduction in the presence of organic bases but the rate of the photo-reduction process for a and b-pheophytines is considerably higher than for a and b-chlorophylls. The reduction process and results obtained are described. Four references. Graphs.

Institution : Acad. of S. USSR, The A. N. Bakh Institute of Biochemistry

Presented by : Academician A. N. Terenin, March 17, 1954

*CAVRILOVA, V.A.*

USSR/Chemistry - Photo biochemistry

Card 1/1 : Pub. 22 - 36/44

Authors : Evstigneyev, V. B., and Gavrilova, V. A.

Title : Mechanism of photo-reduction of certain dyes sensitized with chlorophyll and its allied compounds

Periodical : Dok. AN SSSR 98/6, 1017-1020, October 21, 1954

Abstract : Experimental data regarding the mechanism of photo-reduction of certain chlorophyll sensitized dyes are presented. Six USSR references (1946-1954). Graphs.

Institution: Academy of Sciences USSR, The A. N. Bakh Institute of Biochemistry, Photo-biochemical Laboratory

Presented by: Academician A. N. Terenin, June 26, 1954

*GAVRILOVA, V. A.*

USSR/ Biology - Biochemistry

Card 1/1      Pub. 22 - 34/50

Authors : Yevstigneyev, V. B., and Gavrilova, V. A.

Title : About the oxidation-reduction characteristics of a and b chlorophylls

Periodical : Dok. AN SSSR 100/1, 131-134, Jan. 1, 1955

Abstract : Experimental laboratory data are presented which confirm a previous hypothesis about the direct chemical participation of chlorophyll in all photo-chemical acts of photosynthesis. The most probable mechanism of the participation of chlorophyll in the photosynthesis is considered to be its photo-chemical reduction effect. Certain oxidation-reduction properties of a and b chlorophylls are compared. Seven references: 6 USSR and 1 English (1947-1954). Graphs.

Institution: Acad. of Sc., USSR, The A. N. Bakh Institute of Biochemistry

Presented by: Academician A. N. Terenin, June 26, 1954

GAVRILOVA, V.A.

USSR/ Chemistry - Biochemistry

Card 1/1 Pub. 22 - 26/46

Authors : Yevstingeyev, V. B., and Gavrilova, V. A.

Title : About the change in electric conductivity of chlorophyll solutions and certain other pigments during their photo-reduction

Periodical : Dok. AN SSSR 103/1, 97-100, Jul 1, 1955

Abstract : Experiments were conducted to determine the photoconductivity of chlorophyll solutions and of solutions of certain other pigments. The tests were carried out mostly in pyridine solutions with phenylhydrazine in the role of reducing agent because ascorbic acid as an electrolyte increase the dark conductivity and reduces the relative change in conductivity during illumination. The data obtained during direct and sensitized photo reduction of safranine and neutral red are described. Three USSR references (1919-1955). Graphs; drawing.

Institution : Acad. of Sc., USSR, Inst. of Biochemistry im. A. N. Bakh

Submitted : February 12, 1955

YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.

Reversibility of the Timiriazov-reaction, and the relation between dark- and photochemical reduction of chlorophyll and its analogues. Dokl.AN SSSR 108 no.3:507-510 My '56.(MLRA 9:8)

1. Institut biokhimii imeni A.N. Bakha Akademii nauk SSSR.  
Predstavleno akademikom A.A. Tereninym.  
(Chlorophyll)

GAVRILOVA, V.A.

20-5-41/60

**AUTHOR  
TITLE**

YEVSTIGNEYEV, V.B. and GAVRILOVA, V.A.  
On the Nature of the Primary Photoreduced Form of  
Chlorophyll and its Analogues.  
(O prirode pervichnoy fotovosstanovlennoy formy khlorofilla  
i yego analogov.- Russian)  
Doklady Akademii Nauk SSSR 1957, Vol 114, Nr 5,  
pp 1066-1069 (U.S.S.R.)

**PERIODICAL**

**ABSTRACT**

In laboratory work (see "A:" below) it was shown that  
on illumination of solutions of chlorophyll and its  
analogues which contain a reducing substance the potential  
of an inert metal electrode shifts in negative direction  
when immersed in the solution. This is connected with the  
occurrence in the solution of a labile, electrode-active,  
primary reduced form of pigment. In the case of the pheophy-  
tins, in which this form proved to be more stable than in  
others of the pigments investigated the absorption spectrum  
of this form could successfully be recorded at low tempera-  
ture. It possesses a flat absorption maximum within the  
range of 470-500  $\mu$ m. It was demonstrated that the sensi-  
tivation reactions of the series of oxidizing-reducing  
reactions through chlorophyll or its analogues pass a

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On the Nature of the Primary Photo-reduced Form of Chlorophyll and its Analogues.

stage of formation of the primary reduced form. It is ionized. The nature of this form and its relationship with the secondary reduced red form of the same pigments has not been fully explained. In order to obtain experimental material on this problem a number of experiments with application of spectral and electrometric methods was performed. Fig.1 shows the alterations of potential of the platinum electrode in a solution of chlorophyll and pheophytin in pyridine on illumination of the solution in vacuum. In both cases the potential rises again after an initial decrease. Within a few minutes it attains a level of equilibrium which is determined by the content of the primary reduced form. In switching off the light the potential decreases to the initial level or farther. The explanation has to be sought in the further alteration of the primary form or in its conversion to the secondary one which possesses no electrode-activity, or in the decrease in activity of the primary form itself as a consequence of e.g. interaction with the solvent or reducing agent. Both factors may exert influence here. The conclusion on the change of the primary form, as shown in fig.2, is correct. The position of the minimum of the curve depends on

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chlorophyll concentration. As it is impossible to cite all test results here, the authors only point out that the electrometric measurements under different conditions agree with the above-mentioned assumptions. The absence of electrode-activity in the secondary reduced form is directly confirmed by tests in vacuum by pouring phaeophytine solution to the electrode. Fig. 3 shows the test results on the influence of low temperatures ( $-100^{\circ}$ ) on the formation speed of the primary photoreduced form of phaeophytine. The speed of the reduction progress stays the same at  $-100$ ,  $-60$  and  $20^{\circ}\text{C}$ . Further the speed of the inverse reaction was examined at the same temperatures and in darkness. In the case of phaeophytine at  $-20^{\circ}\text{C}$  the inverse reaction proceeds so slowly that the course of the curve cannot be influenced during the short duration of the test. Therefore the reaction speed is fully determined by the speed of the direct reaction. This evidently proves that the formation of the primarily photoreduced form

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**On the Nature of the Primary Photo-reduced Form of Chlorophyll and its Analogues.**

represents a mere photochemical procedure - transition of an electron from the donor (reduction substance) to the pigment molecule activated by light. The primary form is very capable of reaction, electrode-active, possesses a high reducing potential and a molecule charge. All this indicated that it is probably a compound of the type of an ionized free radical - the semiquinone. The red photo-reduced form apparently is a further alteration product of the primary form by addition of a proton. Whether this takes place directly by addition of the ionized semiquinone or by dismutation is still uncertain.  
(3 fig., 11 Slavic references)

**ASSOCIATION:** "An.N. BAKH" Institute for biochemistry of the Academy of Sciences of the USSR.  
(Institut biokhologii im.A.N. Bakha Akademii nauk SSSR)  
**PRESENTED BY:** An.N. TEREENIN, member of the Academy.  
**SUBMITTED:** 20.12.56  
**AVAILABLE:** Library of Congress.

CARD 4/4

GABRILOVA, V.A.

20-3-30/59

**AUTHORS**

Yevstigneyev, V.B., Gavrilova, V.A.

**TITLE**

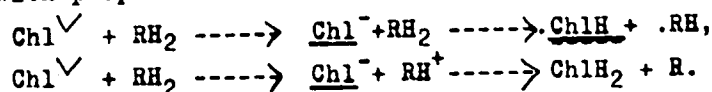
The Nature of the Primary Light Reduced Form of Chlorophyll and its Analogues, as Investigated by the Use of D<sub>2</sub>O.

**PERIODICAL**

(Issledovaniye prirody pervichnoy fotovosstanovlennoy formy khlorofilla i yego analogov s primeneniye D<sub>2</sub>O.-Russian)  
Doklady Akademii Nauk SSSR, 1957, Vol 115, Nr 3, pp 530-533 (U.S.S.R.)

**ABSTRACT**

The data given in former reports prove that the primary light reduced form of chlorophyll and its analogues discovered by the author which are the first light reduced stage of these pigments are according to their nature a free radical, i.e. an ionized semiquinone. It is formed by electron transfer from the reducing substance to the long-lived excited biradical pigment form. The question whether the formation of the primary reduced form is really only the result of the electron transfer to the pigment or whether a proton is also taking part here, can, however, not be considered as definitely solved. By simplifying the system the following 2 reaction series can be realized on the occasion of the light reduction of chlorophyll and its analogues. They contain the formation of the primary reduction product with properties which were discovered in former investigations.



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Chl -chlorophyll in the biradical state, RH<sub>2</sub>=the reducing substance, and Chl -the primary and secondary forms. For the purpose of a de-

The Nature of the Primary Light Reduced Form of ~~20-3-59/59~~  
Chlorophyll and its Analogues, as Investigated by the Use of  $D_2O$ .

finite solution of the question as to which series of these reactions has to be preferred in every case with reference to the formation of the primary reduced form, the authors decided to use the well-known kinetic method which is based upon the substitution of the unstable hydrogen (H) by deuterium (D). Illustration I shows the influence of the substitution of H by D in ascorbic acid on the velocity of formation of the primary and secondary reduced pheophytin -a- forms. The mentioned substitution does not slow down this reaction, on the contrary, it slightly accelerates the reaction. In contrast to that the substitution of  $H_2O$  by  $D_2O$  slows down the velocity of the appearance of the red reduced form to a great extent. The transition of the primary reduced pheophytin product was proved by the direct experiment (fig. 2). Thus the results of the use of  $D_2O$  are absolutely against participation of the proton in the formation of the primary reduced form, in contrast to the formation of the secondary reduced form. The latter is formed by the primary photo-chemical electron transfer from the reducing substance to the pigment which is in the long-lived excited state. The electron connection obviously takes part at an arbitrary place of the system of conjugated bindings which considerably changes the absorption spectrum of the pigment and makes it indistinct. The secondary reduced form is obviously a result of a further proton connection. The absorp-

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20-3-30/59

The Nature of the Primary Light Reduced form of Chlorophyll and its Analogues, as Investigated by the Use of  $D_2O$ .

tion spectrum becomes more discrete though it differs from the spectrum of the initial pigment. The use of  $D_2O$  permitted the repeated confirmation that the red-violet reduced compound which develops on the occasion of the light reduction of phthalocyanine. In spite of its instability represents the secondary reduced form, since its velocity of formation, especially that of the regressive reaction, decreases in the case of the substitution of H by D in the reducing substance. There are 3 illustrations and 8 Slavic references.

ASSOCIATION Institute for Biochemistry "A.N.Bakh" of the A.N. of the U.S.S.R.  
(Institut biokhimiim im.A.N.Bakha Akademii Nauk SSSR)  
PRESENTED By Terenin, A.N. Member of the Academy, March 2, 1957  
SUBMITTED February 22, 1957  
AVAILABLE Library of Congress.  
Card 3/3

GAVRILOVA, V.A. Cand Med Sci -- (diss) "Basic  
*problems*  
~~question~~ of hygiene ~~labor~~ in the *manufacture* ~~production~~  
of alumina by <sup>the</sup> wet alkaline method." Sverdlovsk,  
1958, 20 pp. (Sverdlovsk State Med Inst) 200 copies  
(KL, 21-58, 92)

- 60 -

SOV/137-58-11-23861

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 284 (USSR)

AUTHOR: Gavrilova, V. A.

TITLE: Alkaline Aerosols in the Production of Alumina by the Wet Alkali Method and Their Hygienic Evaluation (Shchelochnyye aerizoli v proizvodstve glinozema mokrym shchelochnym sposobom i ikh gigiyenicheskaya otsenka)

PERIODICAL: Tr. Sverdl. med. in-ta, 1958, Nr 21, pp 269-277

ABSTRACT: The examination of workers engaged in the production of  $Al_2O_3$  by the wet alkaline method disclosed a high incidence of respiratory-tract illness, which assumes chronic forms after a long period of work (over 7 years). The cause of the illness is the constant presence of alkaline aerosols in the shop (S) atmosphere. It is recommended that a system of prophylactic measures be organized, in particular the hermetic sealing of the apparatus and increased ventilation of S in order to decrease the concentration of alkaline aerosols to the maximum permissible limit of  $0.5 \text{ mg/m}^3$  (expressed in terms of NaOH).  
Ye. Z.

Card 1/1



YEVSTIGNEYEV, V.B., GAVRILOVA, V.A., RYBALKA, N.D.

Changes in the oxidation-reduction potential of leaf homogenates  
("green suspension") induced by light [with summary in English].  
Biokhimiia 23 no.6:824-834 N-D '58 (MIRA 11:12)

1. Institut biokhimii imeni A.N. Bakha AN SSSR, Moskva.  
(PLANTS, EFFECT OF LIGHT ON)  
(OXIDATION-REDUCTION REACTION)  
(CHLOROPHYLL)

AUTHORS: Yevstigneyev, V. B., Gavrilova, V. A. 20-118-6-27/43

TITLE: On the Original Reduced Form of Some Compounds Related to Chlorophyll  
(O pervichnoy vosstanovlennoy forme nekotorykh rodstvennykh khlorofillu soyedineniy)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 118, Nr 6, pp. 1146-1149 (USSR).

ABSTRACT: The photochemical reduction of chlorophyll and pheophytin taking place in 2 stages was proved in previous elaborate investigations by the authors (references 1a to 3). The first stage leads to the original reduced form of the pigment. It has the properties of a free radical, viz. of semiquinone. This is achieved by the photochemical transfer of an electron from the reducer to the pigment. Protopheophytin, bacteriopheophytin and haematoporphyrin which are capable of reversible reduction at room-temperature, were investigated in this report (references 3,4). The authors selected magnesiumfree compounds for spectrographical investigations, because they hoped the reduced forms would be more stable (references 2,1 v). The previously described

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On the Original Reduced Form of Some Compounds Related to Chlorophyll 20-118-6-27/43

method (reference 1,2) was applied for the determination of the unstable reduced form, viz. spectrophotometry at low temperatures. A more complete spectrum of absorption of the original reduced pheophytin-form a, than given in reference 1 v, is given in figure 1. A comparison of these two spectra is given. The yellow-greenish initial coloring changes rapidly to a red coloring by the illumination of an evacuated protopheophytin-solution containing ascorbic acid in pyridine, at  $-40^{\circ}\text{C}$ . The product of the reduction has a rather characteristic spectrum of absorption (figure 2) with a small maximum at  $640\text{ m}\mu$ , two maxima within the range of  $550 - 555$  and  $520\text{ m}\mu$ , a pronounced maximum at  $460\text{ m}\mu$  and a flat maximum at  $400\text{ m}\mu$ . The product is apparently rather stable under anaerobic conditions at  $-40^{\circ}\text{C}$ . When air is let in, and the product is shaken, the spectrum returns instantly to the initial state, but it preserves reversibility very well. It reacts as quickly with safranine, riboflavin and several other dyes. The photoreduced solution becomes greenish-yellow by heating up to room-temperature. It is seen from the spectrum that the red product passes over partly into the initial pigment (figure 2). From these properties it may be concluded that

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On the Original Reduced Form of Some Compounds Related to Chlorophyll 20-118-6-27/43

the red product represents a previously unknown form of proto-pheophytin. Bacteriopheophytin was (very) rapidly reduced at low temperature and led usually to yellow, relatively stable products of a deep-going reduction of apparently partly destructive character. An unstable intermediate product was observed more clearly when phenylhydrazine was used as reducer. The spectrum could be plotted only approximately. A maximum of absorption at 640 m  $\mu$  exists there. In the darkness it passes already at low temperature partly over into the initial pigment, partly into the secondary yellowish reduced product without visible maxima. Also the existence of the unstable original reduced form of haematoporphyrine was proved. Due to a white illumination of the pyridin-solution in the presence of ascorbic acid, the pink coloring changed rapidly into orange-yellow at 40°C. The maxima of the initial pigment decreasing due to the photoreduction- and the increasing absorption within the range of about 460 m  $\mu$  are given in figure 3. An illumination lasting more than 30 seconds had no further effect since a state of equilibrium was apparently attained. The admission of air or the addition of other electron-acceptors shows the same effect as with pheophytin. Also heating shows the

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same effects. It may be assumed that the unstable product is semiquinone. The conception that the electron-connection takes place initially at the place of the main system of the conjugated compounds and that it destroys this system (reference 3), is confirmed by the results of this elaborate investigation. The lacking or the presence of metal in the center of the molecule is of great importance for the kinetics of reduction. The replacement of hydrogen by magnesium increases the instability of the initial reduced form of pigment and consequently the capability of the initial pigment for rapid cyclic oxidational reductive conversions.

There are 3 figures, and 5 references, 4 of which are Slavic.

ASSOCIATION: Institute for Biochemistry imeni A.N. Bakh, AS USSR  
(Institut biokhimii im. A. N. Bakha Akademii nauk SSSR)

PRESENTED: November 4, 1957, by A. N. Terenin, Academician.

SUBMITTED: November 1, 1957.

Card 4/4

**AUTHORS:** Yevstigneyev, V. B., Gavrilova, V. A. 20-119-1-34/52

**TITLE:** An Investigation of Some Problems Concerning the Mechanism of Sensitization of Redox Reactions by Chlorophyll and Its Analogues With the Use of D<sub>2</sub>O (Issledovaniye nekotorykh voprosov mekhanizma sensibilizatsii okislitel'no-vosstanovitel'nykh reaktsiy khlorofillom i yego analogami, s primeneniym D<sub>2</sub>O)

**PERIODICAL:** Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 1, pp. 125-128 (USSR)

**ABSTRACT:** In papers (references 1-4, 8b) it was proved that the sensitization mentioned in the title in solutions includes a stage of the formation of a labile pre-reduced form of the sensitizer-pigment which is followed by a reaction of this form with an oxidizer. According to the existing data (references 3,4) an original (primary) photoreduced form which according to its nature is an ionized semiquinone (references 5,6) serves as this reduced intermediate product. A high reactivity of this latter form makes assume that the secondary protonic-form (references 1,4) of the pigment does on this occasion not find time for formation - in any case

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An Investigation of Some Problems Concerning the Mechanism of 20-119-1-34/52  
Sensitization of Redox Reactions by Chlorophyll and Its  
Analogues With the Use of D<sub>2</sub>O

not in quantities which can play a part worth mentioning. A simple scheme of the possible 5 partial chemical reactions in the above-mentioned sensitization is given. The oxidized reducer can form by the series of reactions 1,2,3, or 1,4,5. This reaction mainly takes place according to reactions 1,2,3. When reactions 4 and 5 play a part at all, then it is a minor one. In view of the fundamental importance of the mechanism under review the authors wanted to obtain additional experimental material on it. In this paper they investigate the influence of the substitution of the labile hydrogen in the reducer by deuterium upon the velocity of the photo-reduction of the azo dye in pyridine which was sensitized by chlorophyll or its analogues. As was proved earlier (ref. 7) such a substitution of H by D does not act upon the formation velocity of the primary photoreduced pigment form. But the formation of the reduced proton-form (references 7,8) is strongly slowed down (twice or more). It could therefore be hoped that the use of D<sub>2</sub>O would help to obtain valuable material with regard to the mechanism of sensitization. a + b- and a, b- chlorophyll-solutions, a-pheophytine- and

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**An Investigation of Some Problems Concerning the Mechanism of 20-119-1-34/52  
Sensitization of Redox Reactions by Chlorophyll and Its  
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magnesium-phthalocyanate in pyridine (about  $10^{-5}$  Mol/liter) were used. Ascorbic acid and hydrochloric phenylhydrazine ( $10^{-2}$  -  $10^{-3}$  Mol/liter) were used as reducer. Methyl red was used as hydrogen-electron-acceptor. The velocities of the sensitized reduction of the acceptor under illumination (with the exclusion of oxygen) by light that is only absorbed by the sensitizer-dye (light filter Rg-5) were compared, where 10% H<sub>2</sub>O or D<sub>2</sub>O was added to pyridine. Figure 1 shows the result of an experiment in diagram form. The difference of the reaction velocity in the presence of H<sub>2</sub>O and D<sub>2</sub>O was small. The chief material is given in table 1. No dependence of the experimental results on the change of the quantity of the reducer (ascorbic acid or phenylhydrazine) or on the intensity and time of illumination could hitherto be determined. From the figures of the last line of table 1 clearly follows that such a retardation of the reaction which takes place in the case of a substitution of H by D in the reducer during the formation reaction of the secondary reduced form (40-50%) (references 7,8) does not take place

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An Investigation of Some Problems Concerning the Mechanism of 20-119-1-34/52  
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in this case. Either the velocity of the sensitized reaction is only slightly slowed down or even markedly accelerated. Thereby it is confirmed that the formation of the reduced protonic-form of the sensitizer does not represent an obligatory stage of the sensitized reduction. Therefore the sensitization actually predominantly, if not exclusively, takes place by the formation of the primary, reduced electronic form of the sensitizer with an immediate reaction of this form with the acceptor-oxidizer. The addition of a proton and the formation of the leuco form of the reducible dye apparently takes place on the way of further reactions of the primary (electronic) reduced form (of the ionized semiquinone) of the acceptor (reaction 3). Similar investigations with acetone-solutions of dyes fully confirmed the above-given results.

There are 1 figure, 1 table, and 10 references, 9 of which are Soviet.

ASSOCIATION:  
Card 4/5

Institut biokhimii im. A. N. Bakha Akademii nauk SSSR  
(Institute for Biochemistry imeni A. N. Bakh AS USSR)

An Investigation of Some Problems Concerning the Mechanism of 20-119-1-34/52  
Sensitization of Redox Reactions by Chlorophyll and Its  
Analogues With the Use of D<sub>2</sub>O

PRESENTED: November 4, 1957, by A. N. Terenin, Member, Academy of  
Sciences, USSR

SUBMITTED: November 1, 1957

Card 5/5

YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.

The ability of chlorophyll to photosensitize oxidation-reduction reactions under heterogeneous conditions. Biofizika 4 no. 6:641-649 '59.  
(MIRA 14:4)

1. Institut biokhimii AN SSSR imeni A.N. Bakha, Moskva.  
(CHLOROPHYLL) (OXIDATION-REDUCTION REACTION)  
(PHOTOSYNTHESIS)

17(3)

SOV/20-124-3-57/67

**AUTHORS:**

Yevstigneyev, V. B., Gavrilova, V. A., Savkina, I. G.

**TITLE:**

On the Photoreduction of Bilirubin and Protoporphyrin in Connection With the Study of the Photoreduction of Chlorophyll (O fotovosstanovlenii bilirubina i protoporfirina v svyazi s izucheniym fotovosstanovleniya khlorofilla)

**PERIODICAL:**

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 3, pp 691-694 (USSR)

**ABSTRACT:**

The chemical mechanism of the reaction, mentioned in the title, of chlorophyll and its analogues (discovered and studied at the laboratoriya fotobiokhimii = Laboratory of Photo-Biochemistry of the Institute mentioned in the Association) (Refs 1,2) so far remains unclarified. The authors quote the findings hitherto made with regard to this problem (Refs 1-10). For the purpose of obtaining further data, bilirubin (Ref 12) was tested with regard to its photoreductibility. Bilirubin contains the same 4 pyrrole rings, connected by methine bridges, as the porphyrins, the bond chain, however, remaining open. Therefore, there is a bilirubin absorption maximum in organic solvents in the short wave range of the spectrum, at about 450 mμ. Solutions of reactive bilirubin in pyridine and alcohol were investigated. They contained ascorbic acid or phenylhydrazine. In vacuum tubes, the evacuated solutions were illuminated

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SOV/20-124-3-57/67

On the Photoreduction of Bilirubin and Protoporphyrin in Connection With the  
Study of the Photoreduction of Chlorophyll

through a light filter BS-8 which cuts off the ultraviolet spectrum range below  $370\text{ m}\mu$ , and subjected to spectrophotometry. The tests showed that the bilirubin maximum decreased only slowly and irreversibly, whereas the absorption maxima of chlorophyll and other porphyrin pigments (with or without magnesium in the molecule center) changed significantly and reversibly (Refs 1,2). The counter-reaction did not occur on the addition of air. These findings were confirmed by the electrometrical measuring method of the redox potentials of photoreducible solutions. The test results with bilirubin directly substantiate the assumption that a closed system of conjugate double bonds plays the most important role in the photoreduction of pigments. The results of the tests with the photoreduction of protoporphyrin, as carried out by the authors, also point to this fact (see diagram; Ref 12). Figure 1 shows the changes of the absorption spectrum of an evacuated protoporphyrin solution in pyridine that contains ascorbic acid. They occurred with illumination and with the counter-reaction of the reduced product at room temperature and at  $-40^{\circ}\text{C}$ . From the analogy with the primary processes that take place in the photoreduction of the pheophytins

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SOV/20-124-3-57/67

On the Photoreduction of Bilirubin and Protoporphyrin in Connection With the  
Study of the Photoreduction of Chlorophyll

a and b, of proto-pheophytin, and hematoporphyrin (Refs 2,3), the authors assume that the now formed, highly unstable reduced product (absorbed in the 470-475 m $\mu$  range) constitutes the primary photo-reduced form of protoporphyrin, i.e. a free radical of the type of an ionized semiquinone (Ref 4). Although the lateral substituting groups are not of fundamental importance for the photoreductibility of the pigment, they may nevertheless affect the kinetics of partial reactions, and consequently the result of the reaction in general (Refs 2,3). The capacity of protoporphyrin to form the primary electrode-active form is confirmed by electrometrical measurements of the redox potentials (Fig 2). The above results prove the fact that the photoreduction of protoporphyrin - which does not contain a cyclopentanone ring - yet occurs on the same pattern as in the case of chlorophyll. These results re-confirmed the fact that this very ring system of conjugate double bonds is the localizing point of the photochemical reduction process of the pigment. The absorbed light quanta by acting upon the  $\pi$ -electrons of the system of said bonds, induce the system (due, apparently, to a conversion into a biradical, Ref 16) into a state in which it is capable of receiving a surplus electron. The localizing of the latter (if it occurs at all)

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SOV/20-124-3-57/67

On the Photoreduction of Bilirubin and Protoporphyrin in Connection With the Study of the Photoreduction of Chlorophyll

still remains unknown. In conclusion approaches of the solution of this problem are indicated.- There are 1 figure and 16 references, 13 of which are Soviet.

**ASSOCIATION:** Institut biokhimii im. A. N. Bakha Akademii nauk SSSR  
(Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR)

**PRESENTED:** September 17, 1958, by A. N. Terenin, Academician

**SUBMITTED:** September 15, 1958

Card 4/4

17(3)

AUTHORS:

Yevstigneyev, V. B., Gavrilova, V. A.

SOV/20-126-2-51/64

TITLE:

Photosensitization of Redox Reactions by Chlorophyll Under Heterogeneous Conditions (Fotosensibilizatsiya okislitel'no-vosstanovitel'nykh reaktsiy khlorofillom v geterogennykh usloviyakh)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 2, pp 410-413 (USSR)

ABSTRACT:

There are facts which indicate the ability of chlorophyll mentioned in the title; however, they do not prove it directly (Refs 8,9). Above all such a proof is missing for the aggregated state at an apparently existing separation macro-surface: pigment-medium. The latter system is the subject of the present paper. The medium was an aqueous one: both a) the electron source and b) the electron receiver were solved. In case a) ascorbic acid and in case b) azo dyes were used: methyl red, acidic blue and acidic orange, which supply irreversible reproduction products. As heterogeneous sensitizing systems suspensions of chlorophyll, phycocyanin and magnesium phthalocyanine were used. There were difficulties in obtaining suspensions of the two former pigments which were overcome by recording absorption curves without dye. The photoreaction took place in vacuum vessels (Ref 10) while boiling the solution. Table 1 shows the sensitizing effect of the pigments in experiments

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Photosensitization of Redox Reactions by Chlorophyll Under Heterogeneous Conditions SOV/20-126-2-51/64

carried out by filtering off the pigment particles. A comparison of the absorption quantity in the maxima of the dyes after illumination and after a storing without illumination undoubtedly indicates a photosensitizing effect of the pigment suspension. Further the authors found out that the course of the sensitized reaction can also be followed up without filtering off the pigment. For this reason the extinction of the mixture has to be measured 20 - 30 seconds after shaking (Table 2, Fig 1). The sensitizing effect of the pigment is due to the surmounting of the activation energy of the reaction between the two respective components. The rate of the sensitizing reaction increases at illumination with light which is absorbed by the pigment only (Fig 2A), and also in the case of density increase of the sensitizer suspension (Fig a B) within certain limits. The concentration of the reducing substance exercises a strong effect at low concentrations and vice versa. The sensitizing reaction takes place better in an acid medium. The presence or absence of air in heterogeneous systems in an aqueous medium is without great importance for the reaction rate. In conclusion various hypotheses are expressed concerning the photosensitizing mechanism and papers are discussed (Refs 4, 5, 9 - 18). The

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simplified mechanism described is by all means possible in the case of chloroplast granuli. There are 2 figures, 2 tables, and 18 references, 15 of which are Soviet.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute for Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR)

PRESENTED: January 19, 1959 by A. N. Terenin, Academician

SUBMITTED: December 25, 1958

Card 3/3

17(3)

AUTHORS: Yevstigneyev, V. B., Gavrilova, V. A. SOV/20-127-1-55/65

TITLE: An Investigation of the Mechanism of Photosensibilization of Oxidation-reduction Reactions by Chlorophyll in Solutions by Measuring Their Electroconductivity (Izucheniye mekhanizma fotosensibilizatsii okislitel'no-vosstanovitel'nykh reaktsiy khlorofillom v rastvorakh putem izmereniya elektroprovodnosti)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 198-201 (USSR)

ABSTRACT: A scheme is given initially according to which, in all probability, the sensibilization mentioned in the title proceeds. (Refs 1, 2);  $\text{Chl}^-$  is a primary reduced form of pigment, that is a free radical of the semiquinone type (Ref 3) which is produced by the electron addition to the pigment molecule activated by light. One of the symptoms of the occurrence of  $\text{Chl}^-$  in the solution (under certain conditions, especially in pyridine in the presence of phenyl hydrazine) is the change of the electroconductivity of the solution when it is illuminated (Ref 4). The character of this change and the reduction of the electroconductivity when the light is switched off differs with

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An Investigation of the Mechanism of Photosensibilization SOV/20-127-1-55/65  
of Oxidation-reduction Reactions by Chlorophyll in Solutions by Measuring  
Their Electroconductivity

various dyes, and is determined by the experimental conditions and the properties of the primary form reduced by light as well as by the products of the transformation of other reaction components. Figure 1 shows a typical picture which results from a quick succession of light and darkness in an evacuated chlorophyll-a-solution in pyridine (containing phenyl hydrazine). Proceeding from this mechanism it can be expected that the equilibrium-quantity of  $\text{Chl}^-$  in the presence of an electron acceptor capable of a quick interaction with  $\text{Chl}^-$ , will be much smaller during illumination. This ought to influence the change of the electroconductivity (Refs 1, 5). It is to be expected especially in the case of the chlorophyll a that the introduction of the chlorophyll will considerably reduce and even stop the changes shown in figure 1. Such an effect would prove the correctness of the said mechanism. The influence of the presence of some dyes the reduction by light of which can be sensibilized by chlorophyll a on the changes of the electroconductivity was investigated: methyl red (Ref 6), safranin T (Refs 6, 7), azide blue (Ref 9) and finally carotene (Refs 9, 10, 12, 16). Table 1 shows quite obviously that the

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An Investigation of the Mechanism of Photosensibilization SOV/20-127-1-55/65  
of Oxidation-reduction Reactions by Chlorophyll in Solutions by Measuring  
Their Electroconductivity

said electroconductivity changes cease completely in the presence of the acceptor, but begin again according to the reduction by light of the acceptor. Figure 2 shows the results of experiments with safranin. Its introduction into the solution increases the electroconductivity rapidly. This is the consequence of the ionization of the dye in pyridine. Fluctuations of these changes take place, but stop after several illumination periods. Thus the participation of the ionized form reduced by light of pigment in the sensibilization i.e. the correctness of the initially mentioned scheme was proved. In pheophytin a similar phenomenon is observed, but its picture is not so clear. Table 2 shows the influence of carotene. There are 2 figures, 2 tables, and 16 references, 11 of which are Soviet.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR)

PRESENTED: March 16, 1959, by A. N. Terenin, Academician

SUBMITTED: March 14, 1959

Card 3/3

YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.

Ability of an artificial lipoprotein complex of chlorophyll  
to sensitize oxidation-reduction reactions. Biofizika 6  
no.5:563-571 '61. (MIRA 15:3)

1. Institut biokhimii imeni A.B. Bakha AN SSSR, Moskva.  
(CHLOROPHYLL) (LIPOPROTEINS)  
(OXIDATION-REDUCTION REACTION)

GAVRILOVA, V. I., SAVKINA, I. G., YEVSTHNEYEV, V. B. (USSR)

"Examination of the Photoreduction and photosensitizing  
Ability of Chlorophyll by Measurement of Electroconductivity."

Report presented at the 5th International Biochemistry Congress,  
Moscow, 10-16 August 1961

GAVERLOVA, V. A., SEREBROVSKAYA, K. B. (USSR)

"Sensitizing Action of Chlorophyll in Coacervate Systems."

Report presented at the 5th International Biochemistry Congress,  
Moscow, 10-16 August 1961



30712

S/O20/61/141/002/026/027  
B101/B110

5.4500

27.1110

AUTHORS: Yevstigneyev, V. B., and Gavrilova, V. A.

TITLE: Comparison of reduction potentials of chlorophyll and bacterial pigments exposed to light

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 2, 1961, 477-480

TEXT: For comparison of the reduction potentials of chlorophyll (Cp) obtained from nettle by chromatographic separation, of the bacteriochlorophyll (Bcp) of *Rhodospirillum rubrum* and of the bacterioviridine (Bv) of *Chlorobium laticula*, mixtures of the pigments were exposed to the light of the absorption maximum of Cp and the absorption maximum of the bacterial pigment. The bacterial pigments were prepared by Ye. V. Pakshina, a collaborator in the authors' laboratory. The following mixtures were examined: chlorophyll a + b and bacteriochlorophyll (I); chlorophyll a and bacteriochlorophyll (II); chlorophyll b and bacteriochlorophyll (III); bacteriochlorophyll and bacterioviridine (IV); chlorophyll a and bacterioviridine (V). The examination was carried out in vacuum tubes by means of a Beckmann DU spectrophotometer or an

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S/020/61/141/002/026/027  
B101/B110

Comparison of reduction potentials of ...

Cp-4 (SF-4) spectrophotometer. The band absorbed by Bcp was obtained by means of a light-filter combination (5mm) from C3C-11 (SZS-11)+KC-19 (KS-19) which did not permit penetration of  $<700\text{ m}\mu$  light. The band absorbed by Cp was exposed by means of a filter combination from C3C-3 (SZS-3)+KC-4 (ZhS-4) which allowed penetration of the 410-590  $\text{m}\mu$  band, maximum ~480-470  $\text{m}\mu$ . Experiments with mixture I (approx.  $10^{-5}$  mole/liter)

dissolved in methanol with approx.  $10^{-1}$  mole/liter of phenyl hydrazine as a reducing agent showed the following: On exposure to light (770 $\text{m}\mu$ ) absorbed by Bcp the intensity of the absorption maximum continually decreased, while the intensity of the Cp (660  $\text{m}\mu$ ) absorption band remained unchanged. Exposure to blue light (430  $\text{m}\mu$ ) resulted in quick reduction of light absorption by Bcp, while the absorption maximum of Cp at 660  $\text{m}\mu$  remained almost unchanged. During a control test with Bcp and the reducing agent solely, the intensity of the 770  $\text{m}\mu$  band did not change on exposure to blue light. The same result was obtained for I dissolved in pyridine, ascorbic acid being used as reducing agent, as well as for mixtures II and III. Sensitized reduction of Bcp occurred in each case. The reduction potential of Cp is, therefore, higher than that of Bcp. Under the same conditions pheophytin a and b and protoporphyrin were also effective.

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Comparison of reduction potentials of ... 020/61/141/002/026/027  
S 01/B110

No sensitized reduction of Bcp occurred in mixture IV after exposure to blue light. The reduction potential of the primary reduced form of Bv (Chlorobium-chlorophyll) is, therefore, smaller than that of the corresponding form of Cp. A different process was chosen for mixture V because both pigments have equal absorption spectra and, consequently, separation of light by means of light filters was not possible. 1) The reduction of Cp and Bv was separately examined (dissolved in pyridine, ascorbic acid as a reducing agent). This resulted in a slower reduction of Bv (Fig. 2). 2) The concentration of Cp was a) doubled; b) the same amount of Bv was added. As shown by curves 3 and 4, the addition of Bv inhibited the reduction of Cp. Curve 4 may be interpreted as an acceleration of the reduction of Bv due to the presence of Bv. Therefore, in all the experiments Cp formed active reduced compounds having higher reduction potentials than the corresponding forms of bacteriopigments. Vegetable and bacterial pigments can therefore be distinguished already in the molecular state and not only in the living organism. This contradicts the assumption of the same primary photochemical phase (photolysis of  $H_2O$ ) in bacteria and plants. There are 2 figures and 12 references: 9 Soviet and 3 non-Soviet. The two references to English-Card 3/5 4

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Comparison of reduction potentials of ... S/020/61/141/002/026/027  
B101/B110

language publications read as follows: A. A. Krasnovskiy, Ann. Rev. Plant  
Physiol., 11, 363 (1960); C. Van Niel, Photosynthesis in Plants, 1949,  
p. 437.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR  
(Institute of Biochemistry imeni A. N. Bakh of the Academy  
of Sciences USSR)

PRESENTED: June 24, 1961, by A. N. Terenin, Academician

SUBMITTED: June 12, 1961

Fig. 2. Course of photoreduction in pyridine containing approx.  
 $2 \cdot 10^{-2}$  mole/liter of ascorbic acid. Legend: (1) Bacterio-  
viridine (initial  $K_{670} \approx 0.5$ ); (2) chlorophyll  $a$  ( $K_{670} \approx 0.5$ );  
(3) chlorophyll  $a$  ( $K_{670} \approx 1.0$ ); (4) mixture of bacterioviridine

Card 4/04

SEREBROVSKAYA, K.B.; YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.; OPARIN, A.I.

Photosensitizing activity of chlorophyll in coacervates. Biofizika 7  
no.1:34-41 '62. (MIRA 15:5)

1. Institut biokhimii imeni A.N.Bakha AN SSSR, Moskva.  
(CHLOROPHYLL) (COACERVATES)

YEVSTIGNEYEV, V.B.; SAVKINA, I.G.; CAVRILOVA, V.A.

Photoelectrochemical properties of chlorophyll and phthalocyanine  
films on polarized electrodes. Biofizika 7 no.3:298-305 '62.

(MIRA 15:8)

1. Instiut biokhimii imeni A.N.Bakha AN SSSR, Moskva.  
(CHLOROPHYLL) (PHTHALOCYANINE) (ELECTROCHEMISTRY)  
(PHOTOCHEMISTRY)

VIL'SHAU, K.V.; GAVRILOVA, V.A.

Series of primary saturated normal alcohols. Report No.2:  
Change in physicochemical properties in the series of normal  
primary alcohols and the effect of impurities on their physical  
characteristics. Trudy IREA no.25:347-357 '63.

(MIRA 18:6)

KOMISSAROV, G.G.; GAVRILOVA, V.A.; NEKRASOV, L.I.; KOBOZEV, N.I.;  
YEVSTIGNEYEV, V.B.

Photosensitizing activity of chlorophyll adsorbed on capron as related  
to the surface concentration. Dokl. AN SSSR 150 no.1:174-175 My  
'63. (MIRA 16:6)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova i  
Institut biokhimi im. A.N.Bakha AN SSSR. Predstavleno akademikom  
A.N.Tereninym.

(Chlorophyll) (Nylon) (Photosynthesis)



YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.; SAVKINA, I.G.

Mechanism of the photosensitizing effect of chlorophyll. Dokl.  
AN SSSR 151 no.1:227-230 J1 '63. (MIRA 16:9)

1. Institut biokhimii im. A.N.Bakha AN SSSR. Predstavleno  
akademikom A.N.Tereninym.

(Chlorophyll—Spectra)

L 32718-65 EWG(j)/ENT(1)/EWG(r)/FS(r)-3/EWG(r)/EWG(a)/EWG(c) Pa-5 DD

ACCESSION NR: AP4049435

S/0217/64/009/006/0739/0741

AUTHOR: Yevstigneyev, V. B.; Gavrilova, V. A.

TITLE: Phycoerythrin capacity to photosensitize oxidation reduction processes

SOURCE: Biofizika, v. 9, no. 6, 1964, 739-741

TOPIC TAGS: algae, phycoerythrin, plant pigment, oxidation reduction reaction, methyl red, buffer solution, photosynthesis, photochemical reaction, ascorbic acid, absorption spectrum

ABSTRACT: The validity of the widely accepted position that phycoerythrin found in blue-green and red algae does not participate directly in photosensitization of photosynthesis was investigated. The photosensitizing capacity of phycoerythrin was studied in solutions with different pH values using methyl red as the electron acceptor. Phycoerythrin extracted from Callithamnion rubosum red algae was used in different concentrations in a phosphate buffer (pH 7.5). Reaction of the medium was changed with the addition of hydrochloride or ammonia. Ascorbic acid or hydrochloric phenylhydrazine in a  $10^{-2}M$  concentration was used as a reducer. Photochemical

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reactions were conducted in vacuum vessels in the presence of a 300 watt lamp. Methyl red photoreduction was determined by absorption spectrum changes. With absorption spectra of phycoerythrin and methyl red overlapping to a considerable degree both in acid and alkaline media, direct photochemical reduction of methyl red during light exposure could take place. Therefore, phycoerythrin photosensitizing action was measured by increase in methyl red photoreduction rate compared to the control without pigment. Findings clearly show that phycoerythrin displays photosensitizing action in all media. The photoreduction rate of methyl red increases with higher acidity of the medium and higher phycoerythrin concentration. With phycoerythrin displaying direct photosensitizing effect on oxidation reduction reactions, the prevailing theories concerning the mechanism of phycobile pigments during algae photosynthesis requires further investigation. Orig. art. has: 3 figures.

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AUTHORS: Yevstigneyev, V.B.; Gavrilova, V.A.

TITLE: Comparison of oxidizing potentials of chlorophyll and bacterial pigments under light

SOURCE: AN SSSR. Doklady\*, v. 154, no. 3, 1964, 714-717

TOPIC TAGS: oxidation potential, chlorophyll, bacterial pigment, chlorophyll a chlorophyll b, photooxidation, photoreduction, photosynthesis, primary photooxidation product, photosynthetic intermediate product, photosynthetic kinetics, chlorophyll spectrum, bacterial pigment spectrum

ABSTRACT: In continuation of earlier work on the evolution of photosynthetic function, the ability of one intermediate oxidative reaction product to photosensitize another was investigated, and measured spectrophotometrically, using methanol or pyridine solutions containing chlorophyll a and/or b and bacteriochlorophyll, or

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